Prescription Stimulant Misuse in a Military Population

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ABSTRACT Background: Increased prescription drug misuse has been reported in veterans, yet there has not been a focused look at stimulant misuse in the military community or correlation with deployment injuries and illnesses. Our objective was to identify rates of stimulant misuse and any correlation with deployment in the military population. Methods: A prospective, anonymous institutional review board–approved survey in the emergency department waiting room of a military tertiary care hospital using a 12-item questionnaire created with fixed response and multiple-choice questions. Stimulant misuse was defined as taking more than prescribed, obtaining stimulants from others, and taking it for a nonprescribed reason. Proportions were assessed by Chi-square test and Fisher's exact test. Results: 26/498 (5%) of respondents reported misusing stimulants in the last 5 years. Misusers were more likely to have a mental health diagnosis, and they suffered either a deployment-related injury or another injury, as compared to those who used stimulants properly ($p < 0.05$). The stimulant misuse did not correlate with age, gender, active duty status, education, location of deployment, number of times deployed, traumatic brain injury diagnosis, or enlistment status. Conclusion: Stimulant drug misuse in the military community is associated with mental health conditions, deployment-related injuries, or new physical injuries.

INTRODUCTION

Attention-deficit and hyperactivity disorder (ADHD) is reported to affect between 8% and 12% of children and 4% of adults worldwide. Stimulant medication remains the mainstay for treatment, with the majority of these being amphetamines (i.e., adderall or dexedrine). With an increasing number of patients being diagnosed with ADHD since the 2011 change in diagnostic criteria, the potential for abuse has also increased. From 1998 to 2005, prescription of stimulant medications in the general population increased from 50% to 133% (depending on specific medications). This corresponded to an increased abuse rate of 76% for such drugs, an increase greater than any other form of substance abuse (56%).[1]

Studies on stimulant drug use in the general population have shown an increasing trend toward abuse. A 2012 survey of a large urban community by Stein showed that as many as 40% of students were taking stimulants by either buying them or having falsified symptoms that they knew would lead to a diagnosis of ADHD. The main purpose of this misuse was to improve test performance.[2] A similar survey of health care students in 2013 showed that 11.3% of responders misused prescription stimulants with 66% stating they did it to increase alertness and 57% stating they did it to improve academic performance.[3] McCabe et al[4,5] also looked at the adolescent population and found that individuals who misuse prescription drugs have a higher incidence of both diverting their medications and abusing other substances.

Stimulant use can also lead to serious injury. In a study of Motor-Vehicle Crashes in West Virginia from 2004 to 2005, prevalence of drug use was found to be similar to that of a blood alcohol concentration greater than 0.08 g/dL (26–28%) in those killed. Among these individuals, stimulants were the third most commonly used drug behind narcotics and depressants. New users, occasional users, and persons with recent dose changes were more impaired than those on steady doses.[6] A 2010 study from Levine et al linked poisoning from ADHD drugs to a significant cost. The group compared pediatric admissions from 2000 to 2002 and from 2009 to 2010. It showed not only an increase in nonaccidental overdoses (incidence rate ratio of 3.13) but also a significant increase in cost (over $24,000 for the subjects in time period 2 compared to $5,600 for time period 1).[7]

As diagnosis of behavioral health problems with resulting stimulant drug use becomes more prevalent in our society, we can expect stimulant drug use to become more prevalent in our military forces too. Military jobs encompass both mental and physical stressors and can lead to the impression of zero tolerance for failure. In this way, an active duty service member (ADSM) may face similar pressures to those of a high-achieving student in the classroom. However, like a driver on the highway, they also deal with equipment and situations that can turn deadly in an instant.

The 2008 Department of Defense (DoD) Health Related Behaviors Survey assessed both illicit drugs and nonmedical use of prescription drugs (stimulants, tranquilizers, sedatives, pain relievers, and anabolic steroids). It showed that 2% to 17% of ADSMs misuse prescription medications. Despite a

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decrease in smoking, the perception of decreased job stress, and unchanged illicit drug use, the 2008 prescription drug misuse rate was 11.1% compared to 3.8% in 2005.[8] Although, this survey was not designed to examine prescription drug abuse, a secondary analysis of the data did focus on four different prescription drug categories. This analysis found that individuals who reported stimulant drug abuse were also likely to have reported that they were very likely to abuse drugs in the absence of drug testing and had a prescription for pain relievers in the last 30 days, similar to the other three categories. Individuals were also more likely to abuse prescription drugs if they had symptoms typically associated with stress, i.e., headaches and trouble falling asleep. Because of this, the authors hypothesized that some prescription drug abuse could be secondary to soldiers attempting to self-medicate for physical and/or mental health symptoms.[9]

Identifying soldiers with possible mental health problems has become very important in today's military. A look at postdeployment post-traumatic stress disorder (PTSD), depression, and alcohol misuse in Operation Enduring Freedom/Operation Iraqi Freedom veterans showed that nearly 1 in 5 reported mental health concerns. In particular, James et al found that personality traits of neuroticism (assessed using the Big Five Inventory Personality Examination) were mostly closely related with mental health and substance use in veterans.[10]

PTSD has become one of the most prevalent and costly diagnoses for our ADSMs. Likewise, physical injuries can lead to not only lifelong morbidity but also can have immediate consequences on unit readiness. Finding ways to follow and address possible misuse early may not only help the rising costs of caring for our veterans but also prevent certain mortalities from occurring in the first place, leading to not only a healthier military population but one that also can retain its battlefield effectiveness. Our objective was to describe stimulant misuse and its correlation with deployment in the military population.

METHODS

We conducted a prospective, anonymous survey in the emergency department waiting room of a military tertiary care hospital 7 h/d over 6 weeks. Our study was approved by the Wilford Hall Ambulatory Surgical Center Institutional Review Board. We created a 12-item questionnaire with fixed response and multiple-choice questions including validated questions from the 2010 DoD Survey of Health Related Behaviors. Stimulant misuse was defined as taking more than prescribed, obtaining stimulants from others, and taking it for a nonprescribed reason. We compared misusers to those who properly used stimulants. We expected a margin of error <6% and a response rate >98% based on a sample size of 500 subjects and previous surveys.

All continuous variables were assessed for normality by the Shapiro–Wilk test, as well as by the visual examination of histograms and Q–Q plots. Continuous variables were summarized by mean (standard deviation), and categorical variables were summarized by frequencies (percent) with respect to subgroups of interest. Subgroup analysis was performed on the population reporting "possible and/or confirmed" stimulant use based on survey question #6: "In the last five years, have you taken a 'stimulant' pill or medicine commonly prescribed for ADD/ADHD?" (yes, not sure, no).

Categorical variables of interest were tested for association to stimulant user type (user/misuser) by Chi-square test and Fisher's exact test. Continuous variables were tested for differences among user types using Wilcoxon Rank Sum test.

RESULTS

We distributed 500 surveys and 498 were completed, a 99% completion rate. The mean age was 33 ± 10.7 years, 60% were male, 64% were ADSM, and 41% had deployed with a mean aggregate deployment duration of 17.5 months. Of the 498 respondents, 44 reported stimulant use. Of these 44, 26 (5% of the survey population or 59% of the population who used stimulants) misused stimulants and 18 (3.6%) used stimulants properly. Of the misusers, the mean age was 31 years (SD 9.75), 69% were male, 77% active duty, 52% had deployed in last 5 years, 85% were enlisted, 28% had a traumatic brain injury (TBI), 50% had a mental health diagnosis (83% of these had PTSD), and 48% had a recent physical injury (Table I). Those who misused stimulants

TABLE I. Demographics by Nonuse/Misuse/Use

	Stimulant User Status			
Variable	Nonuse	Misuse	Use	*p*-Value
Age Mean (SD)	33.49 (10.72)	30.65 (9.74)	29.17 (8.93)	0.11[a]
Male, *n* (%)	272 (59.91)	18 (69.23)	9 (50)	0.43[b]
Active Duty *n* (%)	292 (64.18)	20 (76.92)	12 (66.67)	0.41[b]
Enlisted	38 (14.45)	3 (15)	4 (33.33)	0.38[c]
Deployed Last 5 Years-Yes, *n* (%)	184 (40.98)	13 (52)	4 (22.22)	0.14[b]
TBI Last 5 Years-Yes, *n* (%)	67 (15.23)	7 (28)	3 (17.65)	0.21[c]
Mental Health Diagnosis, *n* (%)	332 (74.61)	12 (50)	11 (68.75)	0.03[b]
Physical Injury Last, *n* (%)	117 (26.23)	12 (48)	1 (7.14)	0.02[c]

[a]Kruskal–Wallis test. [b]Chi-square test. [c]Fisher's exact test.

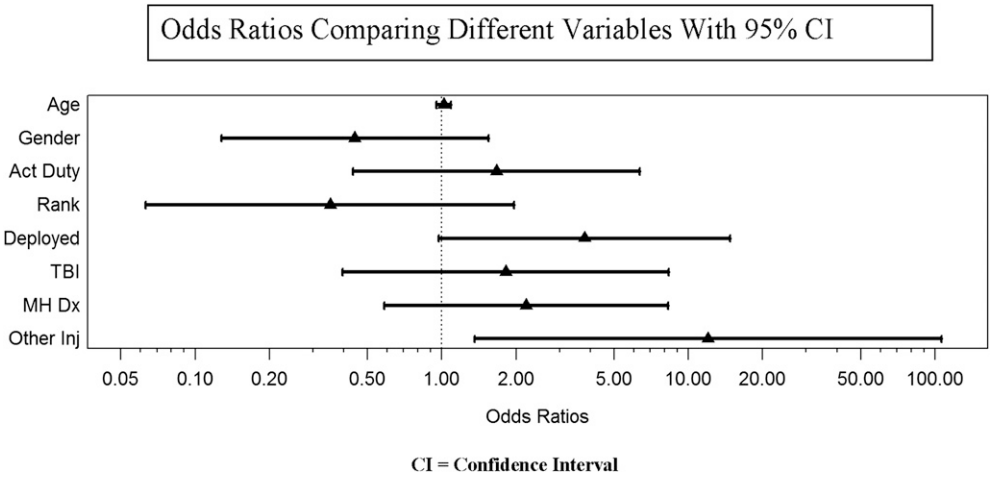

FIGURE 1. Odds ratio comparing different variables with 95% confidence interval.

TABLE II. Independent Univariate Logistic Model Results Modeling the Outcome: Probability of "Misuse"

Variable	OR (95%CI)	*p*-Value[a]
Age	1.02 (0.95–1.09)	0.6
Gender (Male vs. Female)	0.44 (0.13–1.54)	0.2
Active Duty (Yes vs. No)	1.67 (0.44–6.36)	0.45
Rank (Officer vs. Enlisted)	0.35 (0.06–1.96)	0.23
Deployed (Yes vs. No)	3.79 (0.97–14.78)	0.05
TBI (Yes vs. No)	1.81 (0.4–8.31)	0.44
Mental Health Diagnosis (Yes vs. No)	2.2 (0.58–8.28)	0.24
Other Injury (Yes vs. No)	12 (1.36–106.15)	0.03

OR, odds ratio; CI, confidence interval. [a]A logistic model was utilized to assess the effect of each variable of interest independently on the outcome of the misuse of stimulants.

were more likely to have a mental health diagnosis and suffered a deployment-related injury, or any new injury, as compared to those who used stimulants properly ($p < 0.05$) (Fig. 1 and Table II). Comparing misusers to proper users, there was no difference in age, gender, active duty status, education, location of deployment, number of times deployed, TBI diagnosis, or enlistment status (Table III). Although not statistically significant, 2% of misusers stated that they used the medication for school and for work and 40% stated that they misused for ADD/ADHD.

DISCUSSION

Prescription stimulant misuse is on the rise in academic and community centers with the majority of misusers doing so for performance enhancement. We think this also holds true in the military community. The objective of our survey was to evaluate the prevalence of prescription stimulant misuse in a military population and to determine whether such misuse correlates with deployment or deployment-related medical issues. We found that in our population, the patients that we surveyed in the emergency department waiting room, the stimulant use rate was 9%. Military individuals identified as misusers were more likely to have deployment-related complications, such as physical injury or mental health diagnosis.

Only 19 of the 26 misusers answered the question on why they use stimulant medication. Of these, 17 stated ADD/ADHD as the reason for misuse. Since this was an anonymous survey, we are not able to say if these individuals had

TABLE III. Various Age Strata: Independent Univariate Logistic Model Results Modeling the Outcome: Probability of "Misuse"

	All ($N = 44$)	< 40 years ($N = 37$)	< 35 years ($N = 34$)	< 30 years ($N = 28$)	< 25 years ($N = 14$)
Variable	OR (CI)	OR (CI)	OR (CI)	OR (CI)	OR (CI)
Age	1.02 (0.95–1.09)	1 (0.89–1.11)	0.98 (0.86–1.12)	1.01 (0.83–1.22)	0.5 (0.19–1.31)
Gender (Male vs. Female)	0.44 (0.13–1.54)	0.4 (0.1–1.56)	0.31 (0.07–1.32)	0.45 (0.1–2.14)	1 (0.1–10.17)
Active Duty (Yes vs. No)	1.67 (0.44–6.36)	1.92 (0.46–7.99)	1.87 (0.44–7.98)	1.1 (0.22–5.45)	1 (0.1–10.17)
Rank (Officer vs. Enlisted)	0.35 (0.06–1.96)	—	—	—	—
Deployed (Yes vs. No)	3.79 (0.97–14.78)	3.55 (0.76–16.43)	2.55 (0.52–12.37)	2.5 (0.39–16.05)	2.4 (0.16–34.92)
TBI (Yes vs. No)	1.81 (0.4–8.31)	1.33 (0.26–6.74)	2.31 (0.37–14.21)	3.64 (0.35–38.23)	4.5 (0.34–60.15)
Mental Health Diagnosis (Yes vs. No)	2.2 (0.58–8.28)	2.25 (0.52–9.77)	1.8 (0.4–8.07)	2.67 (0.41–17.17)	4.5 (0.34–60.15)
Other Injury (Yes vs. No)	12 (1.36–106.15)	—	—	—	—

OR, odds ratio; CI, confidence interval. A logistic model was utilized to assess the probability of stimulant misuse among different age strata. Convergence criteria not met because of small group sizes for those showing dashed lines.

been given the formal diagnosis of ADD/ADHD or were treating perceived symptoms as suggested by Jeffery et al[9] in their secondary analysis of the 2008 DoD Health Survey. None of the individuals noted concentration, energy, or other as reasons to take the medication, with two citing school/work as the reason for misusing the medication. With such a large number of the misusers stating they were using the medication for what seems to be a legitimate reason, further clarification is needed on whether the stated needs were genuine or whether the respondents intentionally gave misleading answers.

In an evaluation of risk and protective factors associated with PTSD, James et al found that neuroticism was linked with both mental health and substance abuse. Of our responders, 50% who reported stimulant misuse also had a mental health diagnosis. Of those who then answered the follow-on questions, 83% had PTSD. Notably, it was the perception of a threat and not an actual threat that was most closely linked with the diagnosis of PTSD.[10] This raises the question whether stimulant abuse is a risk factor for PTSD by causing the sensation of being at risk or raising the body's awareness, causing the user to feel that there is a risk present. This survey does not address this risk for PTSD, but future research into this area could help to prevent one of the largest growing mental health diagnoses and the secondary affects (mental, physical and financial) that are associated with it. It could also help the military to screen potential recruits.

We also found that stimulant misusers were more likely to suffer from physical injury. Although a different environment, similar conclusions were also found when looking at motor vehicle accidents by Kaplan.[6] We did not ask the respondents how they got the specific injuries (i.e,. explosive device vs. firearm, mounted vs. dismounted, deployed vs. stateside) or the specific role the individual was filling (i.e., point, driver, and follower). The military has a robust drinking and driving mitigation program, but at this time does not have a large program targeting use of prescription medications and operating heavy machinery or doing potentially dangerous tasks. Our results suggest that this is an area that the military could improve on with future research helping to distinguish exact behaviors that are highest risk.

Our study had several limitations; first, because the survey was not proctored, there is a potential that the subjects responded falsely to questions because of not understanding the question, fear of retaliation, being viewed negatively, or simply not wanting to answer truthfully. The population that was surveyed was limited to those in a single Emergency Department, which could potentially seek out those suffering from medical complications or injuries. It also did not specifically ask how long a person had been using medications, if they had been misusing before entering the military or the reason they were prescribed. Because the survey was anonymous, we could not verify the subjects' clinical diagnoses. Lastly, our survey did not address those who were selling or diverting their own prescriptions, which could be considered a form of abuse.

In addition to areas already mentioned, future research needs to be directed at not only the users but also the prescribers, specifically how and why providers prescribe stimulant medication. Ensuring proper diagnosis and treatment of behavioral health illnesses will help to decrease the amount of medication that is available. Additionally, it may also help to address misuse given that several studies have reported that proper use of medication may help to decrease the addictive properties of ADHD.[4,5] Detecting and diagnosing individuals with ADHD in a more timely manner may help to decrease the number of abusers in the system.

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